Date: April 24, 1983

Subject: Primary Metals R & D Monthly Report - April

From/Location: E. L. Cambridge

To/Location: J. G. Kaufman

R & D PROJECTS

High Purity Alumina

The observation that Na_2O levels in alumina prepared by calcining ACH at 1000°C were lower than predicted by the amount of Na_2O in the ACH has been confirmed. Calcination of ACH yielded Al_2O_3 having about 50 percent of the expected Na_2O. The balance is presumably lost as NaCl or $NaAlCl_4$. This effect, if it can be utilized in the ACH calcination step of the low soda alumina process, will further improve product purity.

The grinding study on alumina from the ATH/ACH process is 75 percent complete (2^3 factorial design). Preliminary results on trial runs indicate that our material is 100 percent alpha alumina with surface areas in the 5-7m^2/g range and can be ground to less than 3 microns in 7 hours. These values put it in the range of "reactive" alumina which have good ceramic properties. Samples will be sent for size analysis to Coors since the Microtrac has a lower limit of 2.8 microns. Determination of ceramic properties of the ground alumina will begin as soon as the grinding work is finished.

AD-120 Process

A. Ore to PCACH

Construction of the gas sparging crystallizer and calibration of pump flow rates and the densitometer have been completed. The system has been filled with synthetic mother liquor and a 2^4 factorial design set of experiments started.

Construction of the body of the fluid bed ACH calciner is near completion (at Kushmaul). Inspection of progress revealed a few minor problems that are being corrected. The unit should be ready by the end of April. Components for the other major sub-systems are now on the premises so that construction can begin as soon as the calciner is received.

SEM work on trial PCACH samples is near completion. It appears that the lab here will be able to provide satisfactory results.

B. Chlorination

Work continued in this area on several fronts. A significant analytical

backlog has built up, delaying interpretation and analysis of results. Instrumentation coming on-stream shortly should enable us to significantly reduce this backlog and enhance turnaround time.

C. Instrumentation

The HP 5880 for dedicated measurement of CxCly is now operational. Preliminary calibration work has been conducted and analyses are now underway on unknown samples.

The Carl GC 111 for measuring Cl_2 and $COCl_2$ has been received and is being set up. Computer interfacing for automation of both the Carl and HP is underway. Dave Thigpen will be responsible for all our automated measuring equipment.

D. Planning

There are no changes in the PERT chart plan. The computerized data base for materials and experimentation has not functioned this month due to downtime from the computer relocation.

E. Other

Development of a cost estimate for design and construction of a 12-ton per day pilot plant to produce PCACH from clay was initiated.

ASV Magnetics Project - Columbia Falls

The mechanical shop at Columbia Falls has completed fabrication of the remaining three sets of buswork. One set of buswork has been installed on Pot 518 and the buswork from Pot 304 is scheduled to be moved to Pot 520. When all is completed, a string of five pots will be available for a thorough evaluation. The magnetic probe shield has been repaired. Magnetic data will be taken on regular pots to compare later with the ASV design.

Mitsubishi Technology

The Mitsubishi technology exchange is now scheduled for the week of May 23 at Columbia Falls. Sam Jones will be attending the carbon sessions and Dave Moran will attend the entire five-day exchange. Jim Yeager will represent the Engineering group.

Lithium Bath - Columbia Falls

Lithium pots at Columbia Falls have reached the target 2.5 percent lithium in the bath. The pots are stable with an average operating temperature of 965°C.

Anode Optimization

Work has begun on Phase II of the Columbia Falls anode optimization project. ARCO coke was ground and screened. Bakes with 25 percent Reilly pitch will

be completed in April. The purpose of this set of experiments is to pitch the new aggregate distribution to obtain proper rheological properties and maximum baked density for the Columbia Falls anode.

TECHNICAL SUPPORT/SERVICES

Anode Operations at Columbia Falls

As a result of severe anode dusting at Columbia Falls, ARCO coke is being discontinued temporarily until the situation can be brought under control and thoroughly evaluated. Sam Jones continues to work with the Columbia Falls people in an effort to solve this problem.

Sebree Large Anode Project

The twenty-pot large anode test section at Sebree continues to operate with a higher than normal early anode failure rate. In spite of this the Sebree management is optimistic about eventual success and plan to convert the plant to the large anodes in September of this year.

Sebree Line 4 Cell Technology Selection

Subodh Das is representing Tucson on a team to investigate potential technologies for the possible expansion of the Sebree plant. At meeting was held on April 8 at Sebree and an agreement was reached concerning the relative weight of economic versus operating versus strategic components in making the final decision. A list of ten cell candidates was reduced to three. A final decision for recommended technology will be made by May 16, 1983.

Raw Material Quality Control Review

Sam Jones will be in Sebree the week of May 2 to study and make recommendations on raw material quality control. The areas of study will be (1) raw material specifications, (2) sampling procedures, (3) analytical procedures and (4) rejection limits.

Raw Materials Strategic Planning Committee

Irmgard Murray has suggested the revitalization of the Raw Materials Strategic Planning Committee. Subodh Das and Dave Moran will be representing Tucson at the meeting tentatively scheduled in June at Sebree.

Anode Consumption Furnace

The power supplies have been repaired. The new procedures to prevent liner and crucible cracking will be tested and verified within a week.

FACILITIES

The new laboratory is complete except for fume hoods. They are now due to be shipped by the manufacturer on May 21.

PERSONNEL

- Katy Gray has been promoted to Laboratory Technician from Associate Laboratory Technician in the Ore Processing group.

- W. E. (Bill) Palmer - Senior Laboratory Technician
  Bill transferred from Anaconda Minerals Company to our Ore Processing group, effective March 28. He holds an Associate Degree in Applied Science and had 15 years of related experience with CPC International, Inc. and Kennecott Minerals Corporation before joining Anaconda Minerals two years ago.

- R. David Thigpen - Research Engineer
  Dave transferred from Anaconda Minerals Company to our Metals Extraction group effective April 18. He holds a BS Degree in Chemistry from North Texas State and has had extensive experience in analytical instrumentation for chemical analysis. In this new position, Dave will be responsible for set up, operation, methods development and maintenance of our dedicated, automated laboratory equipment.

- Gerry J. Kujawa has accepted a temporary appointment with us under the Corporate Unassigned Employees Policy. Gerry has been with the Anaconda Minerals Company for the last 2 years. Prior to that he worked 5 years with Exxon Nuclear Incorporated. He will work on design and construction of our pilot plant for high purity alumina production.

- Jerry E. Davis has accepted the position of Senior Research Engineer - Chemical Products. He plans to report approximately May 15.

E. L. CAMBRIDGE

ELC:pm

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